BETTER FRUIT

VOLUME XI APRIL, 1917 NUMBER 10

Special Features

Maintaining the Vigor of Trees.

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By-Product Discussion by Growers at the Spokane Conference.

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Information Showing Excessive Fungus in the Tops of Trees.

***

Timely Hints on Home Gardening.

BETTER FRUIT PUBLISHING COMPANY, PUBLISHERS, HOOD RIVER, OREGON

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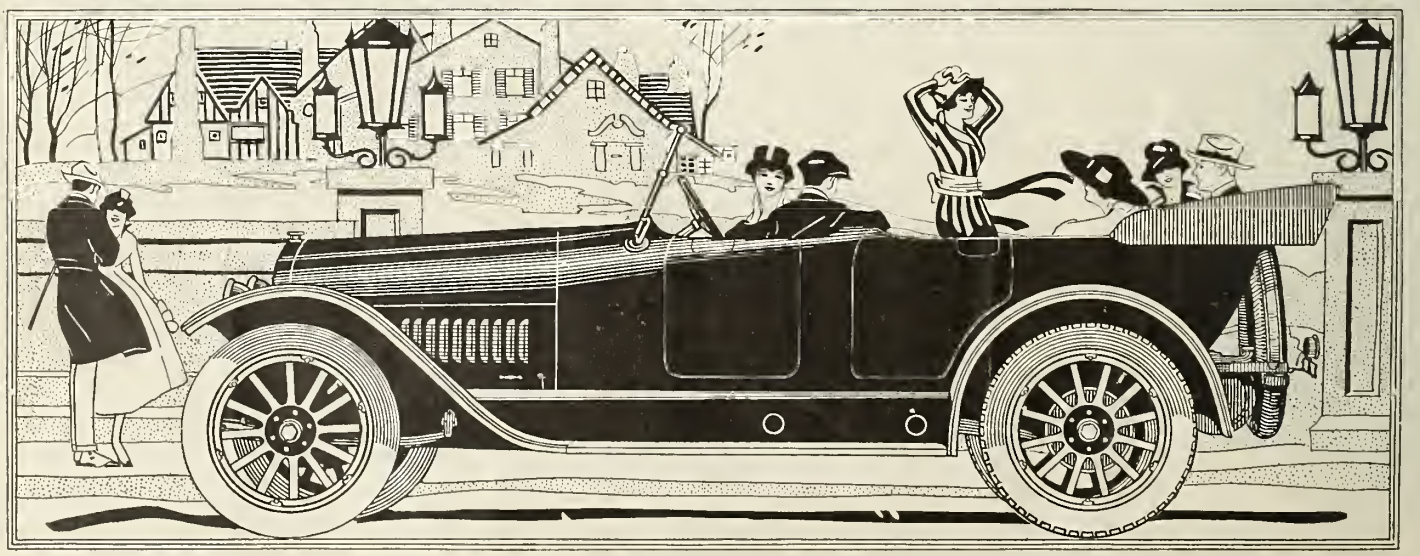

BETTER FRUIT

AN ILLUSTRATED MAGAZINE PUBLISHED MONTHLY IN THE INTEREST OF MODERN, PROGRESSIVE FRUIT GROWING AND MARKETING

Relation of Height of Fruit to Apple Scab Infection

By Leroy Childs, Entomologist and Pathologist, Hood River Branch, Experiment Station

IN the past, while checking up scab experiments under investigation, an interesting observation was made relative to the distribution of scab-infected fruit on the trees examined. Early in the summer it was observed that the fruits in the tops of the trees were much more scabby than those nearer the ground. It seemed probable, then, that since this condition existed in carefully sprayed experimental plots the condition would be found to be present in a more pronounced form where especially careful oversight had not been given each application of spray. Several orchards were examined to determine the correctness of this supposition. In nearly every case this variation in the amount of scab relative to distance from the ground was found to be present, and often very conspicuous indeed.

In view of the important bearing of this discovery upon the whole subject of spraying practice, it was decided to undertake a careful investigation of actual conditions existing at harvest time in certain trees that had been (as was thought) well and carefully sprayed according to schedules that had been arranged by the Experiment Station.

At picking time twelve large trees were chosen in one of the orchards in which scab control experiments were being conducted. These trees were sprayed at the proper time, though not under the personal observation of the writer, and as thoroughly as the equipment of the owner permitted. Seven of these trees received four scab applications (Block 1), the 30-day lime-sulphur application being omitted, and five (Block 2) were given five applications of lime-sulphur.

The apples from Block 1 were picked and separated into three divisions (Figure 1), viz., (1) from the ground to a height of ten feet; (2) from ten feet to fifteen feet; and (3) from fifteen feet to the tops of the trees. After the fruit was picked the percentages of scab were determined for each division in each tree. Only two divisions were made in the case of Block 2 (Figure 2), the fruit being separated from the ground to ten feet, and from ten feet to the tops of the trees.

In choosing the trees from which the counts were made it was necessary to select those which were bearing a relatively light crop and which stood erect. In the case of trees heavily loaded it was impossible to accurately segregate the fruits in their respective normal positions, owing to the sagging of the healiy-laden branches.

The average height of the twelve trees chosen was 26 feet. (Figures 1 and 2.) The largest reached a height of 28 feet. The average greatest diameter of these trees was 22 feet, the widest being 24 feet. Fruit was found present to an average height of 21 feet; on one tree apples were taken 24 feet above the ground.

Although considerable variation was found to exist on the different trees studied, the increase in every case from the ground to the top was found to be constant, the difference in degree of infection in each section of each tree being very pronounced. (See Figures 1 and 2.)

From Block 1, which received four applications of lime-sulphur, the following average percentages of scabby fruits occurred in the respective sections; from the ground to ten feet, 6.52 per cent; from ten to fifteen feet, 22.31 per cent; fifteen feet to the top, 45.72 per cent. The following ratio was observed in the most seriously infected tree: ground to ten feet, 13.72 per cent; ten to fifteen feet, 40.30 per cent; fifteen feet to the top, 60.01 per cent. The fruit in the least infected tree was found to be as follows: ground to ten feet, 2.46 per cent; ten to fifteen feet, 8.23 per cent; fifteen feet to top, 21.47 per cent. The average total scab infection from Block 1 amounted to 22.52 per cent. At first glance an infection of this extent does not appear serious. However, it is so distributed, with nearly 50 per cent of the fruit in the tops of the trees infected, that it cannot be thinned out without heavy losses.

Much less scab was found in Block 2. In this group of trees two divisions only were made in separating the fruit as mentioned previously. (See Figure 2.) A decided variation in the relative amounts of scab according to height was found to occur here, standing out even more distinctly than that in Block 1. An average of but 1.62 per cent infection was found on the fruit between the ground and ten feet, while the infection from ten feet to the tops was 18.08 per cent. The average percentage of scab on these five trees was 12.41 per cent, or nearly half that which occurred on the trees sprayed only four times. The importance of the fifth spray in this case is easily seen.

Unfortunately no segregation of fruit according to height was made from apples on the check trees, so that the natural distribution of scab on unsprayed trees was not determined. However, the total infection present on some of the control trees kept under observation during the past year amounted to 97 per cent. This very high percentage of scabby fruits indicates that infection must have been general over the entire tree.

It is interesting to compare the result from two other experiments conducted in the orchard in which the observations just discussed were obtained. In these experiments, lime-sulphur was used in the same strength and in the same number of applications; i. e., in one (Block 3) five applications were given; in the other (Block 4) four applications were used. Equipment, rodmen and method of application were identical in all four blocks. Though Blocks 3 and 4 were sprayed earlier in all applications the interval existing between these was about the same throughout the orchard, as the trees were sprayed in their regular turn throughout the season. Two material differences, however, appear to be responsible of the differences in the percentages of scab present. In comparing the average heights of the trees in Blocks 1 and 3, a difference of five and a half feet occurs; in Blocks 2 and 4 but three feet difference in the heights exists. Not only this difference in height occurs but in the case of Blocks 3 and 4 personal inspection of the spraying was given by the writer during each application and parts of the trees missed by the rodmen were pointed out and resprayed. No inspection was given in Blocks 1 and 2; both men working with the spray rig operated rods; in the case of very large trees a man spraying cannot tell the parts of the trees that are not hit with the spray.

The trees in both Blocks 3 and 4 were heavily laden with fruit. On this account the figures given in Figures 3 and 4 are not entirely accurate, as it was impossible to segregate the fruit in all cases owing to the confusion brought on by the severe bending of the higher limbs. An accurate percentage of infection was obtained, however, from fruits which were actually above ten feet at the time of picking. It was found in Block 3 that top infection amounted to 3.86 per cent, while the infection from the ground to the top, which included a good many fruits from the upper division, was .95 per cent. An infection of 62.5 per cent was present on adjoining check trees.

Figure 4 illustrates the results obtained in Block 4, where the "30-day" spray was omitted. The trees in this plot averaged larger than in Block 3, but not as large as those in Blocks 1 and 2. Though many top fruits are included in the figures given in the lower division, the differences occurring in

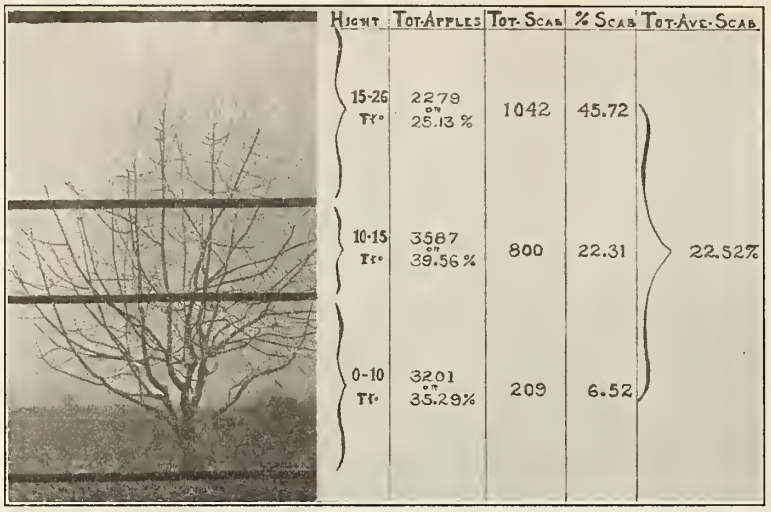

Figure 1. Summary of results obtained in Block 1. These trees were sprayed four times, the "30-day" spray being omitted

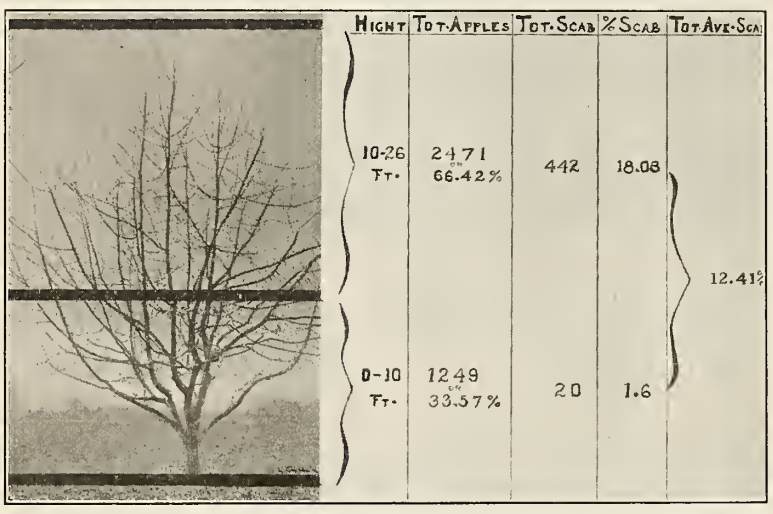

Figure 2. Summary of results obtained in Block 2. These trees were sprayed five times

the two sections are very distinct. An infection of 12.58 per cent occurred in the tops of the trees in this block, while the lower fruits possessed 4.03 per cent scab. Total average infection in this block was 7.42; where five sprays were used (Block 3) it was 1.57 per cent. The possibilities of using the four-spray schedule will be briefly discussed later in the article.

Relation of Fruit Production to Scab Infection

In connection with the percentages determined in Block A, it is interesting to take into consideration the significance of the relative bearing areas of the trees as shown in Figure 1, and their relation to scab infection as found in different parts of the trees. The average production of fruit in these areas does not vary greatly. This distribution was as follows: Ground to ten feet, 35.29 per cent; from ten to fifteen feet, 39.56 per cent; from fifteen feet to the tops of the trees, 25.13 per cent. As would be expected, owing to the fact that trees of this size reach their greatest diameter between ten and fifteen feet, a larger amount of fruit would be found in this section of the tree than elsewhere. The quality of the fruit produced in this section is average of the entire tree. As a rule, however, the larger, physically finer, and more highly-colored apples are produced well toward the tops of the trees, while the lower fruits are usually smaller and subject to more injuries, especially those caused by the brown aphis. In referring to the location of the scab on the trees, it is found that 35.29 per cent of the poorer quality fruit is subjected to a scab infection of but 6.5 per cent, while 25.13 per cent of fine quality fruit in the upper portions of the trees suffers an average loss of 45.72 per cent, due to the attack of scab alone. In the case of the former, ordinary thinning will remove all of the scab with no loss; in the upper part of the trees, with nearly half of the fruit infected, the disfigured apples cannot be eliminated without a heavy loss. That the variations which have been discussed are not local or confined to the particular orchard from which these notes were taken was brought out while checking up some twenty odd scab experiments carried on in several orchards. This variation was found to exist, though not so pronounced in many cases, in every one of them.

Supposed Late Infections Explained

This analysis of the relation of scab infection to the location of fruit on the trees solves a point with reference to reported late summer infection. During the past two seasons many growers have reported to the writer that apple scab was developing rapidly during August. An examination of these reported orchards, however, failed to disclose any pronounced development of new scab. Large heavily-laden trees usually stand upright, holding their fruit throughout the spraying season in about the same location in which bloom occurred, until late July or early August. The fruit on many of the top branches, as shown in the accompanying figures, reaches an average height of twenty-four feet. During late summer and early fall the great weight of fruit on these heavily-laden branches causes them to bend strongly downward. By the middle of August the position of fruit on many branches of the trees is largely reversed; i. e., that fruit which during the spraying season was located in the tops can now be found in many cases at a distance of from four to eight feet from the ground. This bending of the branches in the latter stages is quite rapid. The orchardist, however, in his weekly or fortnightly inspection, fails to note the changes that have taken place or to realize that different apples are being examined than those watched during the early summer. Instead, the grower is alarmed to find, as indicated in Figure 1, an apparent increase in the percentage of scab from perhaps 6.5 per cent (that which he had been watching earlier) to possibly 45.72 per cent, the degree of average top infection found on the trees studied. To the observer unfamiliar with the growth and development of this fungous disease, the phenomenon just described would appear to be that of new development of the disease on the fruit.

Scab Development During Late Summer

Our observations this year indicate that little scab developed on the apples after the first of August. In a large series of experiments apples were kept under observation and examined monthly to determine the relative increase of scab during the season. During late summer few changes in the percentages were noted. On the leaves, however, apple scab was more or less active during most of the past summer. In notes under date of August 30, the following is quoted: "Leaves examined for apple-scab infection indicate that the fungus is still active, as it has been throughout the summer. On trees whose fruit is practically clean there is present much leaf infection, especially on the vigorously growing terminal leaves, which in many cases are literally peppered with olive-green, Mycelium-covered areas. The infection seems to be more conspicuous on trees infested with green aphis, whose leaves have been kept damp with a coating of honeydew.

Cause of Scab Variation With Height

The cause for the very pronounced variation in the degree of infection of fruit from the different locations on the trees can be charged to but one fact—lack of thoroughness in making the applications of the fungicide employed. Theoretically more scab infection should be found in the lower portions of the trees, owing to the proximity, during early spring, to the source of ascospores, and later to summer spore infection when the spores are washed down by rains from infections above. Quite the reverse, however, was found to be true, demonstrating that the fungicides used have been decidedly effective on portions of the trees that have been thoroughly covered. These difficulties can only be corrected by facing the conditions as they arise. In the young orchard, naturally this variation does not exist for the reason that the tops of the trees are just as easily sprayed as the bottoms. With the aging of the apple orchard, the bringing of protection to the higher fruits becomes more problematical as time goes on. The spray outfit which produced highly satisfactory results five years ago must be made adaptable to the growth in height of the trees, or more modern equipment must be installed in its place; for it does not pay to spray unless it can be done thoroughly from top to bottom.

The Successful Type of Spray Nozzle

The type of spray that has been found to give the best results at Hood River in controlling apple scab is applied in the form of a fine mist; double nozzles are usually used, since they enable the operator to apply more material in a given time. To effect complete control of the disease, it has been demonstrated that it is absolutely necessary to cover not only the fruit thoroughly in every application, but also both upper and under surfaces of the foliage—in other words, to prevent literally both fruit and foliage infection. The mist spray, accumulating as it does in fine globules over the surfaces, produces a much thicker, more complete covering than occurs when a drenching or driving spray is used. The latter, breaking and running upon hitting a surface, draws off much of the spray material, leaving, upon drying, an extremely thin film which lacks the lasting and weathering properties of the thicker mist application. The actual application of spray, however, should be made adaptable to different weather conditions. Often it is absolutely necessary to continue spraying in windy weather in order that protection from scab be gained. Under these conditions the mist nozzle should be discarded for a coarser type. This change will enable the rodman more nearly to reach all parts of the trees which would otherwise be impossible. A thin film is much better than none at all.

Incomplete Protection Obtained in Many Orchards and Causes for It

The average orchardist, regardless of the size or age of his trees, sprays with two leads of hose and from the ground. Considering that the rods are twelve feet long (many growers use ten-foot rods) the normal position of the nozzles while in use is at a height of about fourteen feet (see Figure 5). The rodman, in working around the tree, raises the nozzle at intervals to a height of seventeen to eighteen feet (see Figure 6). As a long day wears on, the holding of a heavy rod at arm's length becomes very tiresome; for this reason the operator becomes unconsciously careless and the tops are slighted. By referring to the heights of the fifteen-year-old trees it will be seen that on the average eleven feet of tree surface occurs between the end of the spray rod, when raised to its highest point, and the top foliage. Leaves and fruit in this area, then, are dependent entirely upon the pressure exerted by the outfit and the air, to force and carry the liquid to its proper place. Under absolutely quiet atmospheric conditions it is possible to cover fairly well the under surfaces of the higher foliage and the fruit of these large trees, but a good many top surfaces are missed. With the slightest wind blowing the benefits derived from the air as a carrier are largely reduced, and are completely destroyed by the wind that normally occurs at Hood River during a greater part of the spring. In many instances the writer has observed orchardists spraying in a wind (spraying often has to be done under such conditions) that prevented the reaching of the trees at a greater height than five feet above the end of the rod. The average wind during the spraying season prevents the reaching of the trees at a greater height than six or seven feet above the end of the nozzles, and not very thoroughly at a greater height than four or five feet above. For example, then, considering the tree being sprayed as 28 feet high, the rodman exerting himself to the extent of holding the rod at arm's length does not thoroughly cover anything above twenty-two or twenty-three feet. (Figure 1.) This leaves the fruit and foliage, chiefly foliage, over a surface of five or six feet entirely open to infection. The infection which takes place is most advantageously located to further the spread of the disease over the tree; for with each rain millions of spores are washed down onto the fruit and leaves below, which if not thoroughly protected by a good coating of spray, become readily infected.

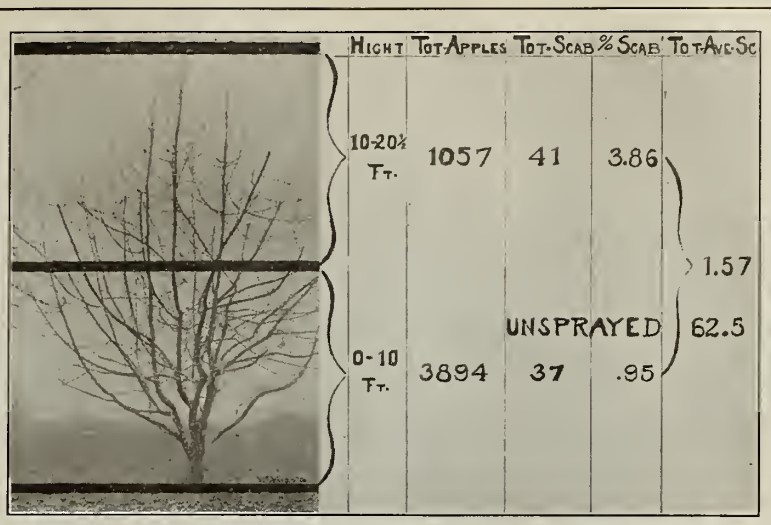

Figure 3. Summary of results obtained in Block 3

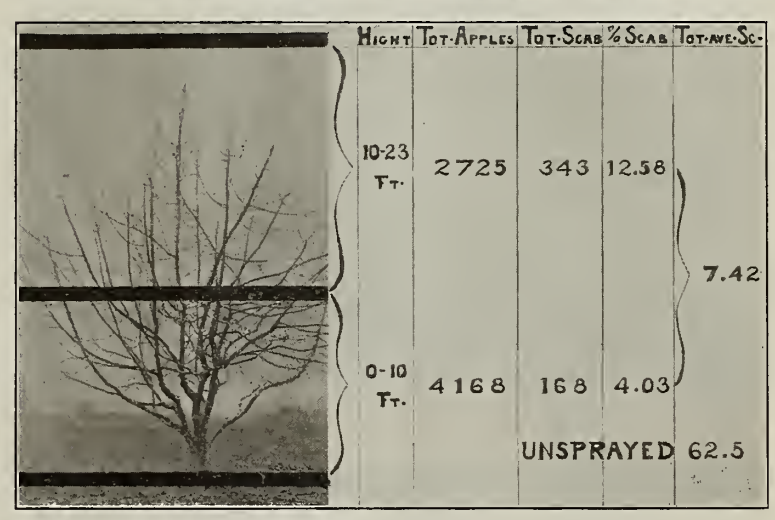

Figure 4. Summary of results obtained in Block 4

FIGURE 5. This shows relative position of the nozzles to the height of a large tree while spraying in a normal position

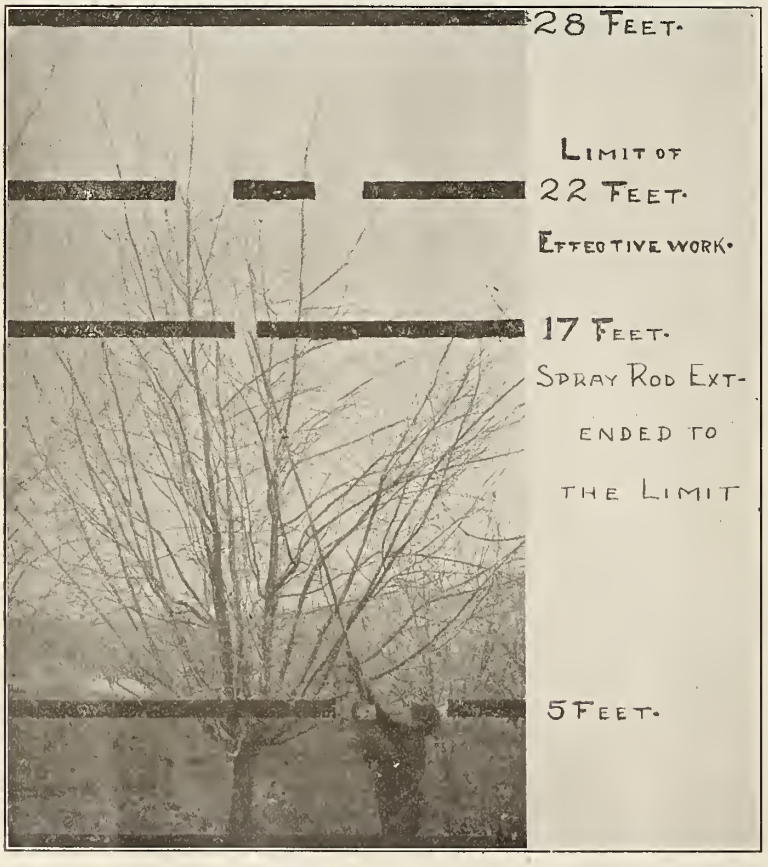

FIGURE 6. This shows the relative position of the nozzles to the height of a large tree when the rod is held at arm's length. Note that there is much tree surface above this point

Is the Fifth Scab Spray Necessary?

The secret of growing scab-free fruit lies in the absolute prevention of leaf infection. If this is accomplished, the apples will incidentally be kept clean. With a portion of the trees left open to infection, even though it be only a few leaves in the top, chances of serious fruit infection, taking place early in the summer, are greatly increased, especially if the 30-day lime-sulphur spray is omitted. The sixteen days of rain which occurred during late June and early July, produced at least 75 per cent of the scab which occurred at Hood River during 1916. Infection could not have taken place if fruit and foliage had been kept clean up to this time. As shown in Block 4, though the results from the standpoint of scab control were not as complete as obtained in Block 3 with five applications, the 7.42 percentage of infection that resulted must be considered a very effective reduction. The trees in this experiment were last sprayed on May 24. On June 17, nearly a month later, rain began falling, continuing some every day until July 3. There is no doubt that a good deal of the protection derived from the last application of spray had disappeared through weathering and expansion of both the fruit and leaves before this favorable scab-infection weather was over. In spite of this long-continued rainy spell, infection of but 7.42 per cent of the fruit resulted. During this time scab increased on the unsprayed check trees from 20.5 per cent to 62.5 per cent. The trees in this plot were known to be practically free from scab at the time the "30-day" spray was applied to the other experiments. The infection of fruit at that time was only .39 per cent, and since it was so clean to begin with, infection failed to develop in serious proportions regardless of the prevailing weather conditions favorable for scab development. There is no doubt that the first four scab sprays scheduled by the Experiment Station are necessary; whether the fifth is required (if we dare draw inferences from one season's work) depends upon the amount of infection present at the time the "30-day" spray should be applied. If the trees are absolutely clean at this time, it appears from the excellent results of the test just described that they need no further applications regardless of the weather conditions. At the present time, however, few orchardists are sufficiently competent to determine whether their fruit and foliage are clean. Clean does not mean that one can find a spot here and there. We have called an infection of .39 per cent fairly clean, and that means the finding of a little more than three scabby apples in each 1,000 examined. Until growers can properly analyze their crop and determine the amount of scab present in actual percentages, it will not be safe to omit the "30-day" spray.

Spray Outfit for Older Orchards

To overcome some of the difficulties that have been discussed, it is necessary for the orchardist to develop and

Continued on page 36

Would you plant your fruit trees in large tubs?

"Without the use of dynamite in tree-planting," says U. S. Bulletin No. 38, "the roots soon meet with the smooth and compacted sides of the hole, through which they have great difficulty in penetrating. The tree is in about the same situation as if it had been planted in a large tub."

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Discussions at Ninth National Apple Show

Following the Address Given by Dr. J. S. Caldwell, "Cost of Operation and Returns from Evaporated Fruits," which appeared in March Edition of "Better Fruit."

Question: What is the best by-products plant to take care of cull apples?

Dr. Caldwell: That brings us back to vinegar plants and evaporators. I should really regret to see any great number of vinegar plants established in the Northwest, because I believe in the long run they cannot be profitable. However prices may be at the present, they fluctuate rather widely, and we are restricted in the area over which we can market such a product on account of bulk and freight rates. The evaporator is inherently more profitable. It will make considerable volume of vinegar from peelings and cores and is more profitable of itself. Canneries cannot handle any very large volume of apples because that market is limited and is not enlarging materially, if at all.

Question: What would be the approximate cost of such a plant?

Dr. Caldwell: That will depend upon the type of building constructed. In a publication which I have on this subject I have recommended three types of evaporators: the old kiln type, which is the least expensive in construction and operation, but in the long run the quality of the output may be slightly inferior; the tunnel type, which is the leading Northwest evaporator and what I have called the all-purpose type. On a basis of eight tons a day, which is about the smallest plant handling apples only, over a season of from 70 to 90 days, I should say a fireproof building, fully equipped with all labor-saving equipment ought to be built ready to run for $5,800. That includes everything except parer and slicer, which would probably cost $750 delivered. That includes everything necessary to begin business with in a fireproof building. Without fireproof construction the cost can be practically what one desires to make it if one wants to take the risk of wood or sheet iron construction.

Mr. Jacobs: Where can you see such a plant?

Dr. Caldwell: So far as I can recall there is no strictly fireproof plant in the Northwest.

Mr. McKee: Eliminate fireproofing, could we find a plant in operation along those lines?

Dr. Caldwell: D. A. Snyder, Dayton, Oregon, has one of the type of plants described in the bulletin, where you will find figures and descriptions. Has been in operation almost thirty years in that building or its predecessor.

Question: Over those thirty years, has he been successful in the operation of his plant?

Dr. Caldwell: Yes, he has. He has the Willamette Valley, of course, for his supply of fruit, and he is unique in that he was the first man to evaporate vegetables and he had that market during all the period of the opening up of Alaska. Mr. Snyder's plant is unique also in the entire absence of labor-saving equipment that would be considered indispensable in putting up a plant at the present time. Hand labor replaces all labor-saving equipment in his plant. It would be possible to reconstruct his plant so as to increase its capacity and greatly decrease the labor cost, but he has been successful in spite of that.

Question: Isn't it true that the liquor manufacturers took a considerable portion of the dried smaller fruits in making certain brands of their products?

Dr. Caldwell: That percentage was about 3½ per cent so far as I can get at the figures. In the aggregate that would cut very little figure. In a normal season the export trade takes something like 68 per cent of the dried apples, 71 per cent on the prunes and so on down the list. Germany has been our greatest purchaser of dried fruits.

Mr. McKee: The prohibition laws would increase the demand for cider?

Dr. Caldwell: Tremendously.

Question: If the Ben Davis apples were put into the dried process what would be the value?

Dr. Caldwell: If one were to use the Ben Davis, orchard run, it should be possible to make 45 to 50 per cent extra fancy stock, which would go on the market in small paper cartons for the better retail trade and bring a considerably higher price. Someone may say there isn't the demand for that material. It is true only 2¼ per cent is of that grade now, but there is a consistent and strong market for a larger amount of it, and I have in my desk some eight or nine letters from dealers in six states, three of them Southern, asking whether it is not possible, with the finer fruit which we produce, to get from the evaporators extra fancy fruit which they can sell to the fancy groceries. There is a demand for material of that character.

Question: How do the Gano and Black Ben evaporate?

Dr. Caldwell: In the dark stock group. That is characteristic of the Black Ben; always sells for a lower price than the Ben Davis.

Mr. Dean: In the factories here in the Northwest, canneries, evaporators, etc., does the manager have an interest in the factory or is the capital raised entirely by the community?

Dr. Caldwell: As for the co-operative plants the figures show that something like 83 per cent of them have been entire failures; that something like 10 per cent of the remainder have never yielded a profit worth mentioning, but have been carried by some other activity in which the co-operative organization was engaged. Which leaves only about 10 per cent that are profitable.

Mr. Dean: The reason I ask is that at Missoula the Chamber of Commerce has funds to finance such a plant, but up to date it has been impossible to find a man who would put any capital in and and act as the manager.

Dr. Caldwell: I haven't known of any instances in which the failures occurred where the manager was heavily interested in the business, but I haven't looked into that detail. But I have seen a great many salted mines in the way of evaporators. I have seen obsolete plants unloaded by a salesman on a community at prices it would have brought ten years earlier when it was usable. That is the difficulty with the business today; so many communities have suffered in this way. That is the chief difficulty in getting by-products plants under way; so many com-

Continued on page 30

Friction

Is the Problem Solved in

Hudson Super-Six

This is to give you a clear understanding of what the Super-Six motor means.

This is why it holds unquestioned the leading place in Motordom. Why it won all the worth-while records. Why it stopped the trend toward Eights and Twelves. And why it gave supremacy—perhaps forever—to this new type of a Six.

What Friction Does

Motion causes friction. You know this in farm machinery. It is friction that finally destroys it.

In a high-speed motor the vibration makes friction a big problem. A large part of the power is consumed by it. The motor's endurance is limited.

So the chief problem in motor car engineering has been the reduction of friction.

Sixes Disappointed

The Six-type was adopted to lessen this vibration. The Light Six, with small bore, was made to lessen it further. But the highest attainment in a Light Six proved a disappointment. Motor friction was not reduced as engineers had hoped.

So some leading makers, including the Hudson, started tests with Eights and Twelves. It was hoped that twin motors, set at angles, would solve the friction problem.

Then Came This

That was in 1915. Many engineers thought the Six type was doomed. That the V-types would displace it, as they had in certain cars.

But in that year Hudson engineers invented the Super-Six. In December, 1915, we were granted patents on it.

Tests proved that this invention added 80 per cent to the efficiency of the Six. And it did that solely by reducing friction beyond any other type.

All Records Won

Last year, in a hundred tests, the Super-Six won all the stock-car records which can prove a motor's value. It won the records for speed, for hill-climbing, for quick acceleration and endurance.

It broke the 24-hour endurance record by 32 per cent. It twice broke the transcontinental record in one continuous 7000-mile round trip.

So, in performance and endurance, the Super-Six has no rival. And that is due to the fact that friction is reduced almost to nil.

The Economy Car

This endurance will probably double the life of the Hudson car. The reduction of friction saves immense power waste.

In addition, we this year add to the Hudson a wonderful gasoline saver.

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Phaeton, 7-passenger, $1650	Touring Sedan . . . $2175	Town Car $2925
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Cabriolet, 3-passenger, 1950	*(All prices f. o. b. Detroit)*	Limousine Landaulet . 3025

HUDSON MOTOR CAR COMPANY, DETROIT, MICHIGAN

Winter Kill in Mild Climates

By Professor C. I. Lewis, Oregon Agricultural College, Corvallis, Oregon

CLIMATIC conditions in Oregon, and especially in that portion of the state west of the Cascade Range, have for the past two years been hard on fruit trees. It has been, so to speak, unusual weather, although I hesitate to use that term, because I am beginning to conclude after eleven years' residence in the state that the only weather we have is unusual. But to trace back our steps for a moment, we will remember that the summer of 1915 was extremely dry. We finished the year with 10 to 20 inches below normal rainfall. Many trees became too dry and suffered, others were overstimulated with irrigation or tillage, because of the very dry condition, which induced some men to practice methods which even under dry conditions tended to overstimulate. This dry summer was followed by a winter of a very freaky nature. We find, for example, that during the entire winter in many sections the ground was unfrozen. It was during a portion of the time saturated with moisture and covered with snow from 1 to 5 feet in depth. At Corvallis, for example, we find that on January 19 the temperature dropped to 8 degrees, and there was hardly a day in the month but what had killing temperatures. By the middle of February there was an abrupt change in the weather. The temperature rose in the day from about 60 to 70 degrees and lowered at night to the vicinity of 30 degrees, which would mean that out in the open orchards freezing temperatures were experienced. In fact there were nine killing frosts during the month. During the latter part of the month the sap was beginning to rise in many of the trees. The abrupt change in temperature, amounting to 30 degrees in three hours, froze the sap. The next day the temperature again rising to about 60 degrees, caused a very rapid thawing. This alternate rapid thawing and freezing proved disastrous to many trees. Had the ground been frozen, the roots probably would have remained inactive, but I think with no frost in the ground the sap was encouraged to rise. The peculiar weather was followed by one of the heaviest frosts in history in the state during the first two weeks in May. The past summer of 1916 proved unusually wet and the fall extremely dry. This made ideal conditions for early killing frosts, and the first week of October found the temperature as low as 20 to 22 degrees. The dry fall seemingly had an influence in hardening the young fruit trees, but was not sufficient to check English walnuts and the result was extreme damage, especially on the low lands, to English walnuts. We find, however, just a reversal of conditions compared with February. The sap starts to flow late in the walnuts and the February weather did not affect them. On the other hand, with some fruits such as apples and pears, the sap starts to flow early, and the weather did affect them. In the fall most fruit trees mature easily, but the walnut matures extremely slow. Thus the fruit trees had little or no damage and the walnuts, because of active sap conditions, were severely damaged.

We use the term "winter killing" in a rather broad sense. Strictly speaking it is not real winter damage as we would expect lower minimum temperatures to really give true winter damage. It is more a condition which is identical with sour sap. One of the causes is a fluctuating temperature, the damage being aggravated by unusual environment such as extreme drouth, poor soil drainage or poor air drainage. The evidences of winter killing were variable. With apples there was a discoloration of the bark above the snow line and rapid splitting and loosening of the bark. With pears it was somewhat the same as with the apples, but in most cases the top of the trees was more severely damaged. On the older trees the blossoms fell, or the fruit shed rapidly after setting. The leaves in some trees did not develop to more than one-tenth their normal size. Some trees did not throw out any leaves. Most of the trees had uninjured roots and tended to throw up strong sprouts. The walnuts which were injured in the fall were simply frozen and meant in some cases a damage back to three-year-old wood.

Last spring some varieties seemed to be more affected than others. For example, trees that were worked over to Northern Spy stock did not seem as badly damaged as some varieties on their own stock. In an orchard consisting of Grimes on Northern Spy stock, there was little or no damage. Wageners were quite severely damaged. Ortleys showed a little or no damage and Yellow Newtowns a small amount of damage, being perhaps more severe in the top of the trees than on the

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Green Manuring

Green manuring, often spoken of as cover cropping, should be practiced more. Henry Holtz, of the Washington Experiment Station, states that green manuring prevents washing, adds organic matter to the soil, prevents leaching, and affords winter pasture.

Summer-fallowed fields, corn fields and even stubble fields wash badly in spring, due to heavy rains and frost. This can be largely prevented by a green manure crop. In some sections of Eastern Washington, where the organic matter is getting low, and there is a rainfall of fifteen inches or more, rye can be sown in the stubble in the fall and plowed under in the spring when the rye is about eight to ten inches high. This material will easily decompose during the following season. In orchards, crops that are well suited for this, especially in the irrigated sections, are vetch, rye, wheat, rape and peas. In the sections of the state west of the Cascade Mountains, where the rainfall is high, a large amount of the plant food material is leached beyond the root zone. This can be prevented by the use of green manures, which will take up the soluble plant food materials and return them again to the soil when plowed under in the spring.

In addition to the beneficial effects upon the soil, green manuring crops make good winter pastures. Much better results can be secured by plowing under two or three tons of barnyard manure per acre with the cover crop. Organic matter must be sustained either by green manuring, crop residues or barnyard manure if the soil fertility is to be maintained.—Bulletin of the State Agricultural Experiment Station, Pullman, Washington.

Control of More Serious Insects at Hood River

By Leroy Childs, Etomologist and Plant Pathologist, Hood River Branch Experiment Station

Leaf Roller.—At the present time the distribution of the leaf roller does not include the entire Hood River Valley. The area of chief infestation includes the Pine Grove section, and generally speaking is found in serious numbers within a radius of not more than a mile and a half or two miles from the Van Horn station. The first spray of the season, consisting of an application of a miscible oil, is directed toward the control of this insect. Oils applied at this time have been observed satisfactorily to control the brown aphis. However, at Hood River it is believed at the present time that with the exception of the leaf roller other insects can be more effectively and economically handled by the use of other sprays.

Brown Aphis.—This is the insect that is responsible for the development of "aphis apples"—small, gnarled clusters of apples that are usually found on the fruit spurs in the lower parts of the trees. If the leaf roller is present in the orchard, spray with miscible oil, as recommended for this insect. If the leaf roller is not present, add tobacco at the rate of 1 to 1200 to the delayed-dormant application of lime-sulphur.

Woolly Apple Aphis.—Experimental work carried on for the control of this insect has up to the present time been productive largely of negative results. This has included fall and spring applications of miscible oils. These findings eliminate oils of the heavier type from being of any decided service in controlling this pest. The insect must be combated in the summer. Tobacco added to the thirty-day spray in 1916 was observed to check the development of this insect. It must be remembered, however, that the thirty-day lime-sulphur spray must be applied with extreme care in order to prevent burning. This means that a thin, even application must be given the trees. To destroy the woolly aphis, a drenching and driving spray has to be employed in order to reach the insect, and for this reason the gaining of one end may defeat the other, and vice versa. Growers who can make these applications separate should do so. In applying the tobacco alone, add 3 or 4 pounds of soap to each 100 gallons of the spray. The woolly aphis at the present time offers more complications relative to its control than any other insect pest present in the Hood River Valley. The infestations as a rule do not become very pronounced until toward the middle of the summer, and some time after the scab sprays have been applied. For this reason, contact insecticides used during the early season have proved of little value in reducing the numbers of this pest. This period of extreme infestation occurs at a time when orchardists are very busy thinning, irrigating, cutting their hay, and doing many other little duties that have been neglected during the long spring siege of spraying. It is very clear, however, that this pest, as far as we know at the present time, can only be handled during the summer time. For this reason it will be necessary to apply at least one extra summer application of tobacco and soap that the pest be kept under control.

Green Aphis.—During the past two seasons the green-apple aphis has been very prevalent in the Hood River Valley, and especially during 1916, at which time more injury was caused by this insect than probably any other single insect pest or plant disease present. This injury was not only due to the "smutting" of the apple, which prevented the proper coloring of red varieties, but produced an injury on account of their feeding on the fruit themselves. In severe cases this injury resulted in a gnarling which resembled somewhat that caused by the brown aphis. On yellow varieties red spots were produced, which resembled in color those caused by the San Jose scale. It was found that if these spots were produced early in the summer, they largely disappeared before the apples were harvested. No experimental work has been attempted in the control of this insect at Hood River. In 1915 and 1916, however, it was observed that no contact insecticide applied before the first of June was of any pronounced benefit in controlling this pest. If the observations made in these two years are a criterion, it will be necessary to fight this insect in the summer, along with the woolly apple aphis. It was observed during the past year that orchards sprayed with the thirty-day application with tobacco 1-1200 were much freer from the green aphis than adjoining unsprayed orchards.

Codling Moth.—Pears as well as apples should be sprayed if the insect has been found attacking this fruit.

Pear Leaf Blister Mite.—This mite overwinters under the bud scales of the pears. In the spring as soon as the leaves appear, they burrow into the newly-developing tissues, causing the foliage, and in some cases the fruit, to become spotted with puffy red areas. These latter turn black, and the leaves usually drop prematurely. This organism is easily controlled by the use of lime-sulphur 1-10 just as the buds are bursting. Applications made later than this time will do little or no good.

San Jose Scale on Pear.—Owing to the fact that it has not been necessary to use much lime-sulphur in the pear orchards up to the present time some have become infested with San Jose scale. These orchards should be sprayed with lime-sulphur 1-10 just as the buds are bursting.

Maintaining the Vigor of the Apple Tree

By C. I. Lewis, Chief Division of Horticulture, Oregon Agricultural College

A LARGE percentage of the apples of the Pacific Northwest are grown on light types of soils, such as volcanic ash, silt, and sand loams. In such soils there is a tendency for the organic matter to oxidize rapidly, and they soon become depleted in nitrogen. Orchards from eleven to twenty years of age in full bearing on such soils often show an alarming condition, the foliage becoming yellow and thin, the blossoms small and inconspicuous, the percentage of set very small, the yield light; and an accumulation of physiological troubles appearing, such as little-leaf, apple rosette, die-back, winter-kill, and similar troubles, which are distinctive of devitalized conditions.

Four years ago the Oregon Experiment Station began making tests with such trees. I prefer, in speaking of such orchards, to use the tree rather than the acre as a unit, since the number of trees per acre varies according to the system of planting. Complete experiments have been tried with the following: Nitrogen, 3.4 pounds per tree; superphosphate, 4.54 pounds per tree; sulphate of potash, 3.4 pounds per tree. These were used singly and in combination of two or three.

In other orchards experiments were carried on solely with nitrogen, as the trees indicted nitrogen deficiency. So far the only result obtained from the complete fertilizers has been secured where nitrogen was used. In the orchards where we have tried all nitrate of soda experiments remarkable results have been secured. The trees were quickly restored to normal condition; the foliage became dark green and thick; the yields often increased tenfold; the pollination, or set of fruit, improved remarkably; the blossoms became highly attractive in color; and the frost damage was much reduced. The color of the fruit was probably not so good as in the checks, but on the whole was of a good commercial grade. An example of the results secured in one such orchard in the past year is shown in the following table:

SPITZENBERG

Plat:	*1*	*2*	*3*	*4*
Nitrate of soda, per tree, lbs.	7.30	5.00	None	3.00
Terminal growth, in.	11.70	9.90	4.10	14.10
Leaf growth—				
Length, inches	2.95	2.92	1.99	2.90
Width, inches	1.79	1.90	1.35	1.85
Yield per tree, loose boxes	16.10	13.44	8.56	12.61
Increase, per cent	87	56	..	47

NEWTOWNS

Plat:	*1*	*2*	*3*	*4*
Nitrate of soda, per tree, lbs.	7.30	5.00	None	3.00
Terminal growth, in.	9.50	6.20	4.50	6.40
Leaf growth—				
Length, inches	2.93	2.79	2.32	2.75
Width, inches	1.92	1.82	1.48	1.93
Yield per tree, loose boxes	14.10	11.90	5.30	9.50
Inerease, per cent	166	124	..	79

Here is shown a response in proportion to the amount of nitrogen used. After examining all factors, such as tree, fruit, etc., we believe that five pounds per tree is about the desirable amount.

This nitrogen should be put on broadcast at least a month before the trees bloom so that the nitrogen will become dissolved and be available for the tree. In locations where the soil is excessively dry so that the nitrate may not dissolve, add a pound of nitrate to every gallon of lime and sulphur spray. This strength is for dormant trees. From three to five gallons should give the tree a good stimulus. To get striking results this food must be applied before the blooming period. The great value of the nitrate seems to be that it is assimilated quickly and gives immediate aid. Our experiments, however, lead us to believe that some general conclusions on the use of nitrate, which have been formerly emphasized, are perhaps rather misleading. We believe that under normal conditions, the amount of leaching may be insignificant. We also believe that the nitrate exerts an influence for several years.

It must be remembered that fertilizers never take the place of tillage; that when men complain of the ground becoming hard and packed and deteriorating in physical condition from the use of fertilizers, it generally means that such men are not tilling the soil properly. To get the best results in-

tensive tillage should be given the soil. Where irrigation cannot be practiced, sow cover crops. Where irrigation can be practiced, put in a crop of clover or alfalfa.

The question is sometimes asked: "Is it possible to overdo the use of nitrate?" It certainly is possible; too much nitrogen makes too much wood growth, has a tendency to make the fruit overgrown, soft, and poorly colored. It should not be applied to the trees unless they show a need for the same. In this way one will avoid any danger of excess. The frequency of application should depend upon the response in the trees. Whenever they show indications of decline or light yield, add nitrogen.

Reports come occasionally that nitrate is a poison, due to the fact that it allows an accumulation of sodium carbonate in the soil, thus increasing alkalinity. There is a bare possibility that, in soils which are exceedingly alkaline and where very heavy applications of soda are used, this is possible. It must be remembered, however, that if enough nitrogen is added to furnish three hundred pounds of soda per acre and all the carbonate of soda accumulated as free alkali, it would increase the alkalinity of the soil only one ten-thousandth of one per cent. That is a very small amount and we are not certain that the carbonate of soda would increase abnormally, as the soil is very complex and there are many factors to be considered. To those who fear an increase of alkalinity the addition of some acid, such as acid phosphate, would be advisable. From one hundred to three hundred pounds of the phosphate per acre, under such conditions, could be be used.

Timely Hints for Home Gardener

U. S. Department Agriculture.

VEGETABLE seed for planting should be ordered at once so as to be on hand as soon as the weather and condition of the soil make planting possible. Before ordering seed the home gardener would do well to look over his garden plot, decide on the best location for each vegetable, and determine how much seed he will require for the space available for each variety.

He will find it helpful to make a rough plan of his garden on a large sheet of wrapping paper. On this plan he can indicate the spaces to be used for each variety and also by means of colored pencils or symbols show where a second crop is to be planted or interplanted between growing rows, and also arrange for the second and third crops which are to follow those previously harvested. Such a plan will enable him to keep the garden busy all season supplying fresh vegetables during the summer and producing in the late fall root and other crops for winter use. Once the heavy preliminary spading and working of the garden has been done, it is about as easy to raise two or three crops as to keep the garden clean of weeds to produce only one picking. The specialists advise those who are not used to gardening

or wish to have their children take an interest in the garden to hire a laborer to do the heavy preliminary spading or breaking up of the soil. This heavy work frequently disgusts novices and children who would continue to take an interest in the garden if their task was simply to fine and cultivate soil already broken up.

The following amounts of seed the garden specialists of the United States Department of Agriculture say are needed to plant approximately 100 feet of row, or enough to supply vegetables for a family of four:

Snap Beans, 1 pint; Pole Lima Beans, ½ pint; Bush Lima Beans, ½ to 1 pint; Early Cabbage, ½ ounce; Carrot, 1 ounce; Cauliflower, 1 packet; Celery, 1 packet; Cucumber, ½ ounce; Eggplant, 1 packet; Kale, or Swiss Chard, ½ ounce; Parsley, 1 packet; Parsnips, ½ ounce; Salsify, 1 ounce; Summer Squash, ½ ounce; Hubbard Type Squash, ½ ounce.

The following vegetables, the specialists say, will undoubtedly be planted in larger amounts than those just mentioned, and the amounts of seed given will be a guide for ordinary requirements. Some families may need more of the various vegetables and others would need less:

Beet, 4 ounces; Late Cabbage, ½ to 1 ounce; Sweet Corn, 1 pint; Lettuce, 1 ounce; Muskmelon, 1 ounce; Onion Sets, 2 quarts; Garden Peas, 2 to 4 quarts; Radish, 1 to 2 ounces; Spinach, ¼ pound in spring and ½ pound in fall; Late Tomatoes, ¼ ounce; Turnips, ¼ pound; Watermelon, 1 ounce.

The string beans, bush lima beans, sweet corn, lettuce, peas and radishes will not all be planted at one time, but successive plantings two to three weeks apart will be made so as to have a fresh supply throughout the season.

Of early Irish potatoes one peck to one-half bushel will be required, and of late potatoes one-half bushel to one bushel, or more, depending upon the amount of ground available for this purpose. If possible, enough Irish potatoes should be grown to last throughout the winter.

In the event that the family wishes to raise vegetables to supply current needs and also to supply a surplus for canning, the amounts indicated above should be considerably increased.

The home gardener should find useful Farmers' Bulletin 255, Home Vegetable Garden, and Farmers' Bulletin 647, Home Garden in the South. The latter is designed particularly for use in the warmer climates, but contains many suggestions that can readily be adapted by home gardeners in the North. The Department of Agriculture will supply these bulletins free on application as long as its stock for free distribution lasts.

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The 1916 Apple Prices and Factors Connected Therewith.—In previous editions of "Better Fruit" the Editor has repeatedly stated that in his opinion the apple crop of the Northwest must be sold in an intelligent, businesslike way, with proper control, in order that the fruit grower may get the market value of his apple crop. Information is being picked up from a number of growers and indiscriminate shippers who disposed of their fruit without any control, which is very significant. One grower shipped two cars of apples, stating he received about 13 cents per box. Another grower is reported to have stated he shipped two cars of apples, receiving for the two cars $21. It ought to be evident that apples going to anyone and returning to the grower such ridiculously low prices can be sold by the handler at very low prices, unless they were rotten or frozen, and still make a big margin of profit. The sale of low priced apples prevents other reliable marketing concerns from getting satisfactory prices. A man usually buys where he can buy the cheapest, providing he can get satisfactory service and quality. There are other important factors connected with the average prices being low last year, which fruit growers should overcome during the coming year. While prices on Extra Fancy 4-tier have been fairly good in many instances, the prices obtained on C grade and 5-tier pulled down the average. The quantity of 4½ and 5-tier and the quantity of C grade frequently will mean a loss or profit to the grower. It is surprising to note this year that all districts show an average of approximately 25 per cent C grade, selling at 65 cents per box, frequently less. It is equally surprising to note that even in the best district 25 per cent of the crop was 5-tier, and in some districts and on some varieties 60 per cent going to 4½ and 5-tier. There is no question about it being a fact that at least 25 per cent of the crop was 5-tier and 25 per cent of it was C grade. That means half of the crop was sold at bottom prices, pulling down the average like blazes. This should be overcome and to a large extent can be overcome. Methods of doing this will be given under separate headings, following this editorial.

Spraying.—Codling moth, scab, aphis and other insect pests are all factors which make Extra Fancy apples C grade. This can be overcome by intelligent spraying, done properly and thoroughly.

* * *

Color.—Sunlight, as every fruit grower knows, is a big factor in color. More color can be produced by properly pruning the tree so that the sunlight can reach the interior of the tree as well as the outside branches.

* * *

Pruning.—Pruning is not only a factor in letting in sunlight to give more color to the apples, but also a factor in reducing the bearing area of the tree, which if too large means small apples.

* * *

Thinning.—Thinning is an important factor in size, as every fruit grower knows, by proper thinning, reducing the crop from three, four and five in a cluster generally to one, occasionally to two, which seems to be the limit, is a big factor in giving size.

* * *

Cultivation.—Every fruit grower who has been in the business for any length of time is aware of the fact that proper moisture condition must be conserved to keep the apple crop continually growing during the entire season, to get size. This can be done by thorough and proper cultivation to a large extent in districts where irrigation is not required.

* * *

Irrigation.—In some districts, like Yakima and Wenatchee, fruit growers seem to realize the importance of proper irrigation, while other districts do not realize its value in making good sizes. However, it must be borne in mind that 1916 was an exceedingly cool year throughout and undoubtedly the fruit grower did suffer in size, no matter how well his cultivation and irrigation was done. But, nevertheless, it seems wise that everybody should endeavor to do irrigation and cultivation most thoroughly this year in order to obtain the maximum average size and avoid excessive 4½ and 5-tier stock.

Advertising the Apple.—The different districts and selling concerns which have carried on advertising campaigns for Northwestern apples in various sections of the country during the past season feel convinced that the advertising has been a factor in creating a demand for Northwestern apples, consequently bringing the grower additional money, because a good demand always means firm prices and frequently better prices. Not only will all the concerns who carried on advertising campaigns during the past season continue to do so during 1917, but other selling concerns are also sufficiently convinced that advertising the Northwestern apple is not only a necessity, but a paying proposition. And so the year 1917 ought to see a much more general campaign carried on than ever before, covering a greater territory. This naturally will be so, inasmuch as more concerns will advertise the Northwestern apple in 1917 than during any past season.

Scab.—A very interesting article appears in this edition on the percentage of scab at various heights in the tree. It is an original article, along original lines of investigation, conducted by Leroy Childs of the Hood River Experiment Station, and presents some data in the way of actual evidence obtained by actual counts, which will be very significant and of great value to the fruit grower in connection with spraying for scab. There is no question but what wormy apples are excessive in the tops of the trees, for the same reason that scab is excessive, for the reason that in very tall trees the spray men have not sprayed them thoroughly in the top branches. Along with this it seems wise to suggest heading back trees to a reasonable height. Where the orchard is too old to do this in a very satisfactory way the grower should resort to towers on his tank, so that the tops of the trees can be sprayed as thoroughly as the middle and lower branches.

Buying.—The trend of prices, as everybody knows, has been upward for the past year. Prices on nearly all commodities are still advancing. At the present time there is no reason to assume that prices on anything will be any lower. On the other hand, it is quite probable that prices will continue to advance. It is also pretty generally known that many supplies are short, materials costly and hard to get; consequently it would seem wise for the fruit growers for these reasons to purchase their requirements as early as possible, and also wise to lay in adequate supplies for the season.

The O. S. U. Cider Cocktail

By W. Paddock, State University, Dayton, Ohio

THE Students' Apple Show at the Ohio State University has grown to be an important institution in our college life. It is conducted along lines similar to our state shows, in fact, it surpasses many of them in size, in number of entries, in quality of fruit, in educational value and in value of premiums offered.

It is needless to say that a show of this kind results in a great deal of good. Aside from the intense enthusiasm aroused and the educational value, a large amount of real business must be done. A 28-page premium list is published, in which a quantity of advertising space is sold; space in booths is sold to manufacturers of spraying machinery and of spray materials and to other firms who wish to advertise their wares. Arrangements are also made for the sale of apples, cider, apple pie, and candy made by the co-eds of the department.

Necessarily the financing of a free show of such magnitude is an item of considerable importance, since several hundred dollars is required to meet all expenses, and many schemes are devised to help swell the funds. It is about one of these items that I started to write, rather than of the show itself. Clean cider fresh from the press is relished by most people and our boys have always made a good deal of money by its sale. This year a new cider drink was devised, which was christened "The O. S. U. Cider Cocktail."

This is made after the fashion of the familiar ice cream soda. A glass is nearly filled with cider, a lump of ice cream is added, then the finishing touch is put on with a small amount of carbonated water.

Some may prefer the addition of a small amount of sweetening in the form of simple syrup, but if the cider is good this will not usually be thought of.

The popularity of this new drink, new to us at least, at our show prompts us to bring it to the attention of your readers. It would appear to us that this drink, together with similar ones which easily can be devised, should pave the way for the sale of vast quantities of concentrated cider and of apple products. Anyway we hope that some of your readers will take a quart of fresh cider to the nearest soda fountain and have a cider cocktail made. If they don't pronounce it the best ever—we will be glad to hear from them.

"As We Mingle, Prejudice Disappears"

By Charles Uhden, Spokane, Washington

I FOUND this sentence some time ago as a footnote of a blank page in some diary. Having read the same, I turned over the leaf without giving the words any further thought, but after a while they came back to my mind. The more I thought about them the more I was impressed with the meaning contained in the one single line, and finally decided to use them as a subject for a paper intended to serve the purpose of removing the antagonistic feeling which has shown itself, at times very marked, at some of our meetings, as well as at other ones at which I happened to be present.

Prejudice is caused by aloofness or exclusiveness, by too large an amount of self-righteousness, by envy, and very often by the tirades of parties who wish to endear themselves with us at the expense of someone else. The arraignment of one class against another by unscrupulous persons cannot be condemned too severely. Prejudice is an unnecessary disturber of good feeling and harmony. It causes distrust unnecessarily, doing injustice one to the other. Very often it leads to demand for vicious legislation or at least such as is injurious to business and prevents one from doing his best for others.

In social life, prejudice disturbs peace, it creates discord and makes enemies out of friends; it even has led to crime.

Prejudice makes the one who fosters it miserable. If we but mingled freely, meeting each other with an open and unprejudiced mind, how different conditions would be; how much more pleasant life would be. We would soon see that this old world is a pretty good place to live in. We would soon find that persons whom we have carefully avoided and often criticized severely are not so bad after all; that they are good hearted and whole souled people trying to be fair and inclined to do right and in general of as good principles as we are; that at times there is concealed under a rough exterior a noble character to be admired by all.

Mingling freely is of great value in business; it inspires confidence. We learn to know each other better, also become convinced that we are not the only honest people in the world, but that there are others who are entitled to confidence and can be entrusted with our business.

Mingling freely promotes business. Prejudice restricts and hinders business. Mingling is the best instructor one can have; one learns through the experience of others. It removes narrowness of ideas and broadens our views. It enables us to distinguish between men and men, and teaches us not to judge a whole class by a single unprincipled individual, but to judge each one by him or herself and upon their merits. In other words, we remember that one black sheep does not make a whole flock so. Mingling will very often show us our own short-comings and prompt us to strive to reform.

Potato Diseases and Seed Selection

State Agricultural College Experiment Station,
Pullman, Washington

The Exeriment Station is issuing popular Bulletin No. 126 on "Potato Growing in Washington." Part II, by Dr. F. D. Heald, Plant Pathologist, includes a general consideration of the prevention and control of potato diseases and a description of thirty non-parasitic and parasitic troubles. At this time it is of importance to call especial attention to seed selection as a preventive measure to lessen the losses during the coming season.

Depending on the object to be attained, the grower has available the following methods of seed selection: (1) Bin selection; (2) field selection; (3) regional selection or the use of certified seed; (4) the tuber unit method; (5) the hill method. Unless provision was made for seed during the past season only the first and third methods are available for selecting seed stock for the coming season.

Perfectly sound tubers free from any evidence of such troubles as wilt, Fusarium rot, black-leg rot or late blight rot should be selected. Such troubles as scab and Rhizoctonia should be kept in mind and it should be the aim to secure tubers as nearly free from these diseases as possible. Wilt-infected tubers can only be detected by cutting a slice from the stem end. Any tubers which show the characteristic bundle browning in the form of dark spots following the bundle ring should be preferably discarded, but if necessity demands it, the bud end may be used, provided the stem end is cut away well below the discolored portion. Tubers or portions of tubers showing any indication of rot should also be discarded. If any considerable number of tubers show bundle browning, it would be advisable to use other stock for seed. In the interests of production the seed tubers should be neither too large nor too small; 2-8 ounces being generally recommended.

Seed may sometimes be obtained from regions known to be free from certain troublesome diseases or "certified seed" may be employed. In the latter case the seed stock has been produced

under a careful system of inspection under state control. Such seed should show a freedom from the more serious tuber-borne troubles and no more than a certain allowable minimum of the less troublesome diseases.

Yakima Valley Traffic Association

Representing over 90% of the Soft-Fruit Tonnage of the Yakima Valley.

North Yakima, Wash., March 17, 1917.

Whereas, the prices now being asked for fruit paper by the paper mills, being about 100 per cent over those paid in 1916, which makes the cost prohibitive to the grower;

And whereas, a very large percentage of the Northwest boxed apples can be marketed without being wrapped, and show the grower just as good or better net returns as though wrapped, and also make considerable saving in labor;

Now therefore be it resolved, that we, the members of the Yakima Valley Traffic Association, which represents 90 per cent of the fruit tonnage of the Yakima Valley, pack the coming season, without wrapping, at least 65 per cent of the apple crop, and that during the season of 1918 we increase the percentage of unwrapped apples to 85 per cent, the apples shipped without paper being the common grades and common varieties.

And be it further resolved, that a copy of this resolution be sent to all apple shippers of the Northwest, soliciting their co-operation.

(Signed) Yakima County Horticultural Union, Hays Fruit Company, Yakima Valley Fruit Growers' Association, White Bros. & Crum Co., E. E. Samson Company, Growers' Service Co., Denney & Company, J. M. Perry & Co., Washington Fruit & Produce Co., Thompson Fruit Company, A. F. Carpenter & Co., Pacific Fruit & Produce Co., Lynch-Taylor Produce Co., Richey & Gilbert Co.

The Union Pacific Follows Its Bonus With Another General Boost for Employes

President J. D. Farrell of the Oregon-Washington Railroad & Navigation Company has just made announcement of that company's plan this year to give its employes the privilege of cultivating its right of way and other lands that may be available for such purposes. "This is done," he explains, "as an aid to national preparedness through the production of vegetable foods." No charge will be made for the privilege, and the only condition is that such products as are grown shall be confined to the use of employes and their families.

"Our great family of employes," he adds, "can splendidly assist in the nation's program of preparedness by adding to the food supply, and all who can do so are earnestly urged to take advantage of this offer."

This announcement further provides that lands not applied for within ten days will be offered to others than employes, when suitably recommended, on the same terms. This move brings into possible productivity a very large area of land as fertile and capable as the average farm, and if the offer can be improved it will absolutely remove from the employe's family expense account the cost of vegetables for an entire year.

Cutting Wisdom Teeth and Orchard Costs

By L. F. Dumas, Dayton, Washington

THE necessity for a more economical production of apples is becoming more and more apparent. In the past we have not given this phase of fruit growing sufficient consideration. When the pioneers of the Northwestern apple industry had proved to their own satisfaction and to the satisfaction of others that there were normal and in many instances abnormal profits in apples, the cost question was pushed aside for questions concerning the best (though not the cheapest) methods of pruning, spraying, cultivation, etc. These things were yet in their experimental stage; but it seemed to be definitely settled at that time, and for all time, that profit would follow in the wake of all plantings where good judgment was used in conjunction with modern methods. So, in association meetings, fruit growers' institutes, bulletins and fruit journals, we discussed the fundamental problems relating to soils, the planting, the shaping and the care of the tree, perhaps forgetting for a time that there was a monetary side to all these operations. If you should take the trouble to go back through the Year Books of this association you would find that only recently has much emphasis been placed on doing things cheaply.—We said, "Above all else let us do them well."

That the result of this policy was of great benefit in developing a superior product is unquestionable. The Northwestern fruit grower has produced apples of "character"—apples of such a character that they have been in demand over other apples from other sections. As long as the supply of our own product was limited, we could, within certain limits, ask and get what we wanted for it. But now we have such an increased production right at home that we must compete not only Northwest with California, and with Colorado and with the large producing sections of the East, but also Northwest with Northwest, state with state and district with district. We are no longer in a position to dictate prices. Now our brother fruit grower across the fence or across the state, who can produce apples like ours for ten cents a box less, and who is not in the business for his health, can undersell us, or if he can get the same price we get, he can make more than we can. Should we be called on to face a number of lean years, the chances are that he is going to last longer than we are.

Under this new competitive condition, which, it seems, is with us to stay, it is becoming apparent that it will be a question of the survival of the fittest, and the fittest man is going to be the one who can get quality the cheapest. Instead of "quality at any price," then, we must make "quality at a minimum price" our slogan. Mr. Shepherd has pointed this out repeatedly. He began preaching economy before it was considered "good form" to speak of cheap apples. We are just beginning to heed him. By some, he has been misinterpreted, for they have sacrificed quality to cost. It should not take them long to find out that this extreme does not pay either. But, in general, cost carelessness is gradually giving way to cost carefulness. A few of us are beginning to keep books. A few know just what each orchard operation is costing—a few have made a cost study of each process with a view towards determin-

Statement of the Ownership, Management, Circulation, Etc.

Required by the Act of Congress of August 24, 1912,

of "Better Fruit," Published Monthly at Hood River, Oregon, for April, 1917.

State of Oregon, } ss.
County of Hood River, }

Before me, a notary public in and for the state and county aforesaid, personally appeared E. H. Shepard, who having been duly sworn according to law, deposes and says that he is the editor and business manager of "Better Fruit," and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business manager are:
Publisher, Better Fruit Publishing Company. Postoffice address, Hood River, Oregon.
Editor, E. H. Shepard. Postoffice address, Hood River, Oregon.
Managing Editor, E. H. Shepard. Postoffice address, Hood River, Oregon.
Business Manager, E. H. Shepard. Postoffice address, Hood River, Oregon.

2. That the owners are: (Give names and addresses of individual owners, or if a corporation, give its name and the names and addresses of stockholders owning or holding one per cent or more of the total amount of stock.)
Better Fruit Publishing Company. E. H. Shepard, Hood River, Oregon.

3. That the known bondholders, mortgagees and other security holders owning or holding one per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association or corporation has any interest direct or indirect in the said stock, bonds or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is: (This information is required from daily publications only.)

(Signed) E. H. SHEPARD,
Editor and Business Manager.

Sworn to and subscribed before me this 28th day of March, 1917.
(Seal) ERNEST C. SMITH,
Notary Public for the State of Oregon.
(My Commission expires August 1, 1920.)

ing efficiency methods and of standardizing these methods. For, during the last five years, we have been cutting our wisdom teeth. It may be that for some of us, perhaps, they have not yet even sprouted. For a larger number their growth has been the occasion of considerable pain, and the pain has extended right down into the pocketbook. However that may be, we have gradually been forced to the realization that fruit growing is "business" and that to make it "good business" we must follow certain business rules.

The primary rule of every producing and selling business is to make the best article possible with the least possible expense. Has the production cost of apples been reduced to the lowest degree consistent with the growing of a superior article? All figures available at this time seem to say that this is not the case. Let us face the facts. Other big industries have cost systems and efficiency experts. Northwestern fruit growers have united in no systematic effort to gain efficiency in their production. By this I mean with particular reference to cost reduction. Many individual growers have sought to reduce costs, but as a body we have done nothing. We have heretofore compared notes on how to fight pests, how to handle soils that are blowing away or are sticking together too tightly, and how to pick and sort and pack our fruit, but we have never come together with the express purpose of finding out how cheaply and at the same time how efficiently these same things might be done.

One of the first steps in an efficiency program is the standardization of each process in the growing, manufacture, construction or sale of an article. Have we any such standard by which to grow apples? It may be true that conditions are so different on different fruit farms that we cannot attempt to say, it shall cost to much per acre to prune, so much per tree to thin, or so much per box to put fruit on board the cars, i.e., it seems that an absolute standard would be impossible. But at the same time a relative standard which will enable each of us to compare our own cost items with the cost of each step in a process, item by item, as worked out by a number of economical growers, and thus enable us to see where we are possibly spending too much, and are perhaps using the wrong methods—such a system would seem to be a prime necessity. But how to arrive at such a standard? By a quizz sent out to all growers? That has been tried in getting other information and is not uniformly successful. By means of a paid investigator? We might be more successful this way, but if we are aiming at economy this looks like more expense. We would probably not be willing to dig down into our pockets for very much. Shall we ask the government experts to do this for us? If we do, sometime, somewhere their reports would be printed—it takes a long, long time to get definite results this way. Suppose that, during the time allotted for discussion following the reading of this paper, the members present compare notes on cost items—at best the result would be hazy. In such a short

time and with other equally important matters claiming our attention, we could get at very little of the meat of the cost proposition. So I propose that, instead, a number of us who are really interested in reducing costs shall keep monthly records of the cost of each orchard operation, with full explanations of the methods used in reducing costs, and that we turn these in, to our district inspector or to some other official, who shall tabulate and summarize our reports, and present his summation for publication in our next year's proceedings.

In Oregon Bulletin No. 132, "Economics of Apple Orcharding," we have the actual costs of different orchard operations given by one thousand Northwestern growers—big growers, small growers, intelligent growers (and growers with less intelligence), economical growers, wasteful growers, and indifferent growers of the "don't know and don't give a d—" type. We also have some well balanced recommendations as to how in a general way we may reduce these costs. But in this study which I propose, we will get the costs and the methods used in reducing costs of a small number of interested men whose endeavor it will be to practice the utmost economy all along the line. We might make this into the nature of a contest to ascertain who could show the most cost improvement in a year, or a competition to see who could get the best results at the least cost—some such plan as in the boys' and girls' acre of corn or acre of spuds contests.

I believe that one of our inspectors, or one of the State College men, or one of the Federal experts will be willing to undertake the working out of this plan, with the tabulation of methods and of costs. I am sure that I myself am willing to send in monthly cost and

method records. If this plan appeals as a logical way to get at orchard costs there should be a number here who will give their names to the secretary or their inspector after the meeting, that they may be later supplied with blanks and instructions for making their reports uniform. I realize that this means considerable work for whoever goes into it, and suppose there are very few growers here who would deny that they have already more than they can attend to, and because of this such a detailed study of the cost proposition may be passed up. The fact remains, however, whether we like it or not, and whether we like to say so right out in meeting or not, that there has not been much money made growing apples in the last five years, and that if the cost proposition is not reduced down to its lowest terms there will be still less made in the next five years. We've either got to "make good," get out, or get kicked out. So let's either take this scheme, or leave it, and adopt another one. Whatever happens, let us try to find out how to produce our apples at a less cost. I would like to outline in a general way just what a study of costs would consist of, showing what the Oregon Agricultural College Station has reported in Bulletin No. 132 concerning present costs, and drawing what conclusions we may from the few figures available.

Orchard costs may be divided under three main headings: (1) Maintenance costs; (2) Overhead costs; (3) Handling costs. Under maintenance costs we include pruning, cultivation, spraying, irrigation, cover crops, fertilizers, thinning, propping and like items. The Oregon bulletin, presenting figures taken from one thousand growers in the Northwest, shows an annual maintenance cost of $40.75 per acre on trees 10 to 18 years of age—$40.75 per acre with an average yield per acre of 233 boxes, making maintenance cost amount to 17.8 cents per box. Compared with this are the figures from the same bulletin of an 11-year-old orchard in Idaho with a maintenance cost of $25.35 per acre, producing 241 boxes to the acre, making a cost of 10.5 cents per box for maintenance. As a further comparison, our figures on Pomona Ranch, near Dayton, Washington, trees 16 and 17 years old: Maintenance per acre $39.40; yield 351 boxes per acre; maintenance cost per box 11.2 cents. These figures are of value to show, (1) that it is possible to grow apples at a maintenance cost of around 10 cents a box, which would be a saving of 7 or 8 cents a box over the average for the Northwest, and, (2) that the ability to keep down maintenance cost depends a great deal on getting high yields per acre, every year, with rigid economy in getting these yields.

Under overhead costs we include taxes, insurance, depreciation, salary of manager, interest on the investment. There is a tendency to pass these things by as relatively unimportant. The fact is that they are very important. In the Oregon bulletin Professor Lewis gives the average overhead cost per acre for the Northwest at $110.76, as compared with $40.75 per acre for maintenance. This makes overhead figure at 47 cents per box, as compared with 17.8 cents per box for maintenance. It is hard to conceive that fruit growers as a whole

pay close to 50 cents a box, half of every dollar of returns, for overhead expense. A great variation exists in these costs, however, when we come to consider the individual orchards reviewed in the bulletin, overhead ranging from as low as 20 cents to as high as 60 cents per box in trees 10 years and older. The reason for this lies in the great variability in investment amounts, both original costs and development costs. Some raw land has been rawer than other, and some real estate merchants have bought Pierce-Arrows instead of "Fierce-Narrows." Too many orchards have been planted without enough emphasis being placed on the necessity of paying interest on the investment. As a result, the apples produced, although selling at fancy prices, are having to pay out a large portion of each dollar returned on original investment. In general it might be said that an overhead cost of over 40 cents a box is too high, and that the grower who will survive the chilling years to come is the one who can grow his apples with an overhead of less than 30 cents per box. This cost, from its very nature, cannot be standardized, but a study of it will not hurt anyone.

Handling costs cover two fields: (1) Picking and packing expense, in which we include picking, grading, packing, trucking, hauling, paper, boxes, temporary storage or association charges, putting on board the cars, and supervision. (2) Selling expense, which includes all selling charges. For a thoroughgoing discussion of handling costs I would like to refer you to Mr. Shepherd's paper of last year, in which each item is handled separately, and comes as near being standardized as we can hope to get for some time. Mr. Shepherd gave as his cost of handling for 1915 31.9 cents per box. He said that a saving might be made beyond that of 4.5 cents per box, making total cost of harvesting at 27.5 cents per box. I believe that if we were to ask him he would say that his cost has increased this year, due to the increased cost of materials and increased labor prices. Our cost near Dayton increased from 31.7 cents in 1914 to 35.5 cents in 1916. Picking cost us a cent more, grading amounted to 3.6 cents per box, an increase of 1.6 cents over 1914. To set a price at which apples should be harvested without a great waste, let us say, then, that 32 cents a box is about a standard. Then, taking maintenance, overhead and handling costs, we have 10 plus 30 plus 32 cents, that is, 72 cents cost—i.e., between 70 and 75 cents—a cost at which apples must be raised under present conditions to be profitable. I would like to go into more detail concerning handling costs, but this is an entire subject in itself, so if you are at all interested get last year's Year Book and read Mr. Shephard's paper. Then keep cost accounts of your own, and help in collecting information for next year's meeting.

Winter Kill in Mild Climates

Continued from page 12

trunk. With pears the d'Anjou and Winter Nelis showed much more damage than Bartletts. d'Anjous on even some of the best rolling, deep, well-drained soils of the state were very severely damaged. Young prunes and cherries showed a great deal of top damage.

The treatment of such damaged trees would naturally vary according to degree of injury. Where splitting occurred and only a few trees were affected, binding the bodies with burlap seemed to be efficacious. Where many trees were damaged, experiments were tried. One method consisted of tacking the bark to the tree, especially along the lines of cleavage, with heavy bill-posting tacks. Very few trees so treated were lost. All sprouts on the trees having trunk damage should be allowed to remain. Where it was possible to secure long scions for bridge grafting, it was very easy to save such trees. Where this could not be done, the growing sprouts might keep the roots alive and could possibly be used in some cases this spring for bridge grafting. If the top dies entirely a new top can be developed from the sprouts, or, in some cases, it will probably be wiser to replant. For pears and cherry trees showing top damage, it was found best early in the season to leave the trees alone. Thousands of trees that at pruning time looked as though they were going to die, showed little or no damage by the middle of June. Those trees which, however, did not show in-indications of a rapid recovery seem to be improved by a heavy cutting back of the tops. In many cases the trees were found to throw out adventitious shoots and develop a good healthy top. With walnuts which were severely damaged this fall the only remedy would be to cut back to live tissue by early spring so as to allow a proper outlet for the sap. Otherwise there will be an aggravation of a so-called sour sap condition.

One cannot help but feel, in conclusion, that these troubles can to a certain extent be controlled by keeping trees in as nearly a normal condition as possible. Conditions, however, this past year were so extreme that even with such trees some damage could be expected.

Tells of Agricultural Progress of Northwest

E. E. Faville of Spokane, Washington, editor of the Western Farmer, published at Spokane and Portland, Oregon, is in Chicago for a few days for the purpose of inspecting the work and exhibits of the Chicago Herald Land and Industrial Bureau and Exhibition, looking toward representation for the Pacific Northwest.

Mr. Faville, who is markedly enthusiastic regarding the bureau and exhibition, and anxiously eager to have the State of Washington enrolled among active exhibitors and beneficiaries, has interesting things to say of the recent

upward progress and development of Washington and Oregon.

"The rapidity with which these states have adopted a system of diversified farming and live-stock raising has been wonderful," in Mr. Faville's opinion. "Especially has there been a marked increase in the growing of alfalfa and other forage crops—an initial step toward crop rotation and essential to the maintenance of soil fertility.

"The original impetus resulting in this economic advancement was imparted in 1913, when Professor P. G. Holden, prominent in agricultural extension work, conducted 960 meetings in a territory embracing 225 square miles.

"At that time the Pacific Northwest was a buying region. Now it has an annual surplus of food and feeds to sell, and the importation of butter and dairy products has entirely ceased. In the last five years Oregon has increased the number of her dairy cattle 30 per cent, with the Washington increase showing 40 per cent. The increase in other cattle has been much more marked, 120 per cent in Oregon and 370 per cent in Washington. Among the many other promising improvements may be mentioned a system of great terminal warehouses for the handling of the largely increased grain harvests and a better method of handling grain on the farms.

"Other fine movements have been set going also, as, for example, that of better roads and the rural credit system just now receiving united attention from farmers and business men alike. As a result of all this intelligent effort, the earning power per farm in the Pacific Northwest has been increased to $4,000—the highest in the country.

"Since better farming always leads to better homes and a better people, a splendid school system, in which agricultural education plays an important part, has been built up. The percentage of illiteracy in Oregon and Washington is lower than in any other state."

Mr. Faville knows whereof he speaks when he commends the Chicago Herald Land and Industrial Bureau and Exhibition. And he knows whereof he speaks, also, when he talks of the Pacific Northwest's remarkable gains.

The Tent Caterpillar

With the first warm days of spring the larvæ of the tent caterpillar escape from the eggshells in which they have lain dormant during the winter. Trees infested with larvæ during the early part of the year, or those in the immediate vicinity, are perhaps more likely to be chosen by the parent moth for the deposition of her eggs, and such trees at least should be searched.

The recommendations of the United States Department of Agriculture's entomologists for the control of this pest are, briefly, as follows: As soon as small nests are detected, they should be destroyed, as this prevents further defoliation of the tree. When within convenient reach the nests may be torn out with a brush, with gloved hand or otherwise, and the larvæ crushed on the

ground, care being taken to destroy any caterpillars which have remained on the tree.

The use of a torch to burn out the nests will be found convenient when they occur in the higher parts of the trees. In using the torch great care is necessary that no important injury be done to the tree; it should not be used in burning out nests except in the smaller branches and twigs, the killing of which would be of no special importance. Nests in the larger limbs should be destroyed by hand, as the use of the torch may kill the bark, resulting in permanent injury.

Tent caterpillars are readily destroyed by arsenicals sprayed on the foliage of trees infested by them. Any of the arsenical insecticides may be used, as Paris green, Scheele's green, arsenate of lead, etc. The first two are used at the rate of one-half pound to fifty gallons of water. The milk of lime made from two to three pounds of stone lime should be added to neutralize any caustic effect of the arsenical on the foliage. Arsenate of lead is used at the rate of two pounds to each fifty gallons of water.

On stone fruits, such as cherry, peach and plum, arsenicals are likely to cause injury to foliage and must be used with caution, if at all. On such trees the arsenate of lead is preferable, as it is less injurious to foliage, and on all trees it sticks much better. In spraying for the tent caterpillar only, applications should be made while the caterpillars are yet small, as they then succumb more quickly to poisons than when more nearly full grown, and prompt treatment stops further defoliation of the trees.—Office of Information, U. S. Department of Agriculture.

Potato Bulletin

The high price of potatoes at present has stimulated renewed interest in their production and the acreage of the country will doubtless increase materially the coming season. The yield and quality of the crop will depend very largely on the character of the seed bed and the character and condition of the seed. Mindful of the importance of these factors, the Washington Experiment Station at Pullman has just issued a comprehensive bulletin dealing with potato culture, potato diseases, and pests. The first part of the bulletin is by Professor Morris and deals with the types of soil, preparation of the seed bed, selection of seed, planting, cultivation, harvesting, etc., of the potatoes. The second part of the bulletin is by Dr. Heald and deals with the numerous diseases of the potatoes and methods of combatting the same. The third part, by Mr. Yothers, deals with the various insect pests and methods of controlling the latter. The bulletin contains some 120 pages and is illustrated in detail. It will not be sent to the regular mailing list of the station, but may be had upon application to the experiment station.

Discussions at Ninth Apple Show

Continued from page 10

munities have been bitten and taken steps which showed poor judgment.

Question: Is it as easy to dispose of evaporated fruit as any kind of fruit?

Dr. Caldwell: Yes, taking a period of years into consideration. The volume of evaporated apples fluctuates directly as the apple crop of Western New York because 75 per cent of the evaporated apples are made there. This year their crop is short; some of their evaporators did not run more than two weeks, as against 80 or 90 days in ordinary seasons. Their output won't be 10 per cent of what it has been during the last five-year period; that means that the total volume put on the market this year will be about one-third of the 1913-1914 output, which was normal. That, of course, means high prices over the next eighteen months.

Question: Are apples held over from one year to the next of good quality?

Dr. Caldwell: If dried to 27 per cent moisture they are very nearly as perishable as fresh fruit; they can be handled only during the cold months and they deteriorate promptly as soon as shipped into warmer territory. I may say that the New York producers have absolutely slain their Southern markets. For the past seven or eight years it has been practically impossible to find on the market of one of the Southern States an apple made in New York, for the simple reason that they won't keep and the dealer must get rid of them while the cold weather lasts. That is not true of the Virginia product. I have over at the Apple Show samples coming from five evaporators in Washington or Oregon, which have been kept in my laboratory in the open in an ordinary wooden packing box for 9½ or 10 months and no deterioration has occurred. Those samples were evaporated to 22 to 24 per cent moisture. I see no reason why they should not be kept five years.

Question: What would be the increased cost of drying to 22-24 per cent moisture?

Dr. Caldwell: No increase for labor and an increase of about 5 per cent for fuel and a cutting down of the volume to be handled of about 5-6 per cent. The larger portion of the difference in the water content would be taken out not on the dryer itself, but in the carrying room.

Question: If you wanted to start a by-products plant in your community, would you try to interest private capital or have an association concern?

Dr. Caldwell: The associations will have to handle this business of necessity in the final analysis. So long as your acreage is made up of 25 per cent of varieties which are consistently unprofitable, the association will have to come to it, not next year or the year after, but in five years to come they will have to do it to save the grower from himself. The association will have to take steps to keep those varieties out of the market. They can't do that until this thing has gone on until prices for all varieties have been beaten down below the present level, until the seriousness of the situation is realized by everyone concerned. When that time comes the associations will have to take up themselves the burden of carrying the fellow whose orchard is made up of these undesirable varieties. That can only be done by the by-products plant. I will say of those 83 per cent of by-products plants that failed, that 60 per cent were foreordained and predestined before the first nail was driven in the building, for it was perfectly clear to anyone that the thing could do nothing but fail. Of course the remaining 20 per cent failed because co-operation was not co-operation in that particular district. The fault lay at the door of the grower. He wouldn't make long-term contracts. The cannery can't exist from year to year with no definite business basis for operation.

Question: Of course you would advise associations to get busy before those real hard times come?

Dr. Caldwell: That is the reason for my existence. A good many of us see those hard times coming.

Chairman: What would be the cost of drying apples?

Dr. Caldwell: From $5.25 to $7.00 or $7.25 per ton; $5.25 assumes that the factory is going to run 120 to 180 days, beginning with berries in July and continuing work until Christmas when it finishes with the apples; $7.00 is on the the assumption of an average length of running not to exceed 90 days. This will be the manufacturing cost per ton of dried fruit.

Question: What is the objection to the private concern?

Dr. Caldwell: Simply that you haven't it. The private individual rarely has the capital necessary to put up a plant of sufficient size to cut any figure in the reduction of the waste of the community. He usually builds because of lack of money, on a scale to save his own waste, and that is in most cases too small to be profitable and is usually abandoned in a few years for that reason. So that he neither helps himself, his neighbor or anybody else.

Question: I had figured that the objection to the private concern was that it would not pay the grower a fair price for his fruit; how is that?

Dr. Caldwell: The only answer to that question is whether the supply of

material is so great that he can get what he wants without paying a fair price for it. Ordinarily, I believe, there is not any great danger that the grower will not get fair treatment from the private individual. At least it is not so in the private plants of which I have any knowledge. The grower is getting about all he could reasonably expect.

The private individual must have what amounts to co-operation on the part of the growers. If he is building a plant on the assumption that he is going to run 180 days of the year, beginning with loganberries, etc., and the grower puts his fruit on the market fresh for two or three years because he finds it more profitable, then that private individual is going broke. You will not get private capital to build without the assurance that he can provide himself against such a condition as that. Bankers and men with money say they will not put $10,000 or $15,000 into a community for by-products because the grower will have no interest and he will step from under when he can dispose of his fruit for 10 cents more a ton than they can pay.

Mr. Leedy: At the present price of evaporated apples, what can the evaporator afford to pay the grower for green fruit?

Dr. Caldwell: $9.00 or $10.00 a ton.

Mr. Doty: Will the present desirable varieties continue so?

Dr. Caldwell: Of course I can't say definitely. Of course we know that the variety which is the most desirable in one state is not the most desirable in the next state. The highest priced apple in New York is not the highest priced apple in Philadelphia or Chicago. Of course we can't say that the apple which is the highest priced now will be so ten years hence.

Mr. Paulus: But you can reasonably state that apples which are undesirable at the present time will continue to be so.

Chairman: How many tons of culls should be provided for per acre each year—what is the average?

Mr. Green: At White Salmon we count about one-half ton.

Mr. Van Holderbeck: One and one-half tons per acre in a bearing orchard.

Dr. Caldwell: Evaporation must not be considered a panacea for growers' trouble. It offers possibilities of help, but everywhere there are very definite limitations upon those possibilities, and those limitations must be clearly understood. I think that very great harm has been done here in the Northwest by a few misinformed people, by reckless and enthusiastic people who have presented statements of the possibilities which were very wide of the facts. The net result has been that it disgusted the grower who investigated when he found out that he had been misinformed, and in two or three cases where evaporators were started there has been extreme dissatisfaction, the growers feeling that the man in charge was imposing upon them.

Mr. McKee: Over how long a period did you gather data of the average price of the dried products?

Dr. Caldwell: Over a period of two years here in the Northwest for a monthly average and in an intermittent, gapy fashion over a longer period, and for the New York markets over a much longer period, and it is to those markets that we must look rather than to the markets here in the Northwest, for the reason that those are the fellows who will determine what we are going to get for our product when we come into competition with them for the foreign markets. That is the established market and it is the one which will pull down any high prices we are getting here as soon as our products reach it and come in conflict with it.

Mr. Hanauer: We have grafted over some of our undesirable varieties into Rome Beautys and have gotten from 20 to 30 boxes to the tree. I wouldn't urge anyone to pull out his trees if he is fortunately located. We wish all our apples were Rome Beautys.

Question: Does it pay to top graft worthless varieties to profitable ones?

Twelve voted in favor of it, eleven against it.

Mr. Van Holderbeck: It does not pay, at least it will cost more than it is worth.

Mr. Paulus, Salem Fruit Growers' Association, Salem, Oregon: The by-products plant at Salem is the best situated of any by-products plant in the Northwest, but down in Salem we don't call it a by-products plant but a fruit-products factory. Our association was organized in 1909 with a membership of 160, which has since increased to 525. Our volume of business is over one-half million dollars a year and we are handling the products off of 2,500 acres of prunes, about 1,000 acres of loganberries and about 3,000 to 4,000 acres of other fruits, small fruits, cherries, apples, etc. We don't handle many apples and we have not encouraged anybody to put out many. We were, however, the means of getting one of the largest apple-juice factories in the Northwest started, the Northwest Fruit Products Plant at Olympia. When the state went dry it made it necessary for the State Brewery Association to find another business. I went to the manager and board of directors and for about three months worked with them to start a loganberry-juice factory. Before that our board of directors had appropriated $2,500 to make experiments with logenberry juice. We had an oversupply of loganberries and unless we had developed the juice business we would have been goners. We made a great many experiments in connection with Professor Lewis, who furnished us a man who started in during the season making juice and making notes of the different processes. After about three months' work I got the brewery people to consent to go into the loganberry-juice business. I think there are now about fifteen loganberry-juice factories making a total of about one-half million gallons of juice.

We dry loganberries, cherries, apples, etc. We have not found it profitable to compete with California peaches, which are sun dried. This year we handled about 3,000,000 pounds of prunes, which

will go in carloads to thirty-two different cities. We have a car going to New York, Norfolk, Pittsburg, Boston, Philadelphia, Louisville, Buffalo, Montreal, Winnipeg, Saskatoon, Calgary, Portland, Seattle, Superior (Wis.), Minneapolis, St. Paul, Omaha, St. Joseph (Mo.), Atchison, Wichita, two cars to Kansas City, Memphis (Tenn.), Guthrie (Okla.) and Dallas (Texas). In addition we will put a couple of cars in England. We had arrangements made to market in all European markets when the war broke out. This year the British government is only allowing 50 per cent of dried fruit to be imported that was brought in last year, so we were only able to ship a couple of cars, although we could have sold a great many more had the embargo been off.

I have been very much interested in the discussion this morning for the reason that we have had to go through during the past seven or eight years what you people are just starting into. If you people are going into the dried-fruit business you have got to go into it and stay in it; you can't expect to use it as a relief one year and not have a dried product the next year. People expect to get fruit from you year after year. If you don't provide for the maintenance of your dried-fruit business, if you dry one year and ship fresh fruit the next year, the following year when you go into the markets you will find that your people have made arrangements somewhere else.

It may interest you to know something about the dried-loganberry business. Several years ago there were a great many people planting loganberries. The dried loganberry went fine on a limited scale, but it wasn't any length of time until there were 2,000 acres set out. In 1913 there were about three carloads which were marketed at profitable prices. When the big oversupply came the growers naturally turned to the unions to help them out of their trouble. In 1915 we took in 367,000 pounds of dried loganberries as against three cars of the year before. The marketing of that quantity of berries immediately became quite a problem. The growers didn't feel in a position to dig up several cents a pound for advertising. We had advanced to the amount of $43,000 on that crop, which is what I would call a bonehead stunt. We were practically advancing 10 cents a pound against a product for which there was no market, and we would be obliged to get that 10 cents because we could not get it out of the grower. The next year the same process was repeated. We advanced $37,000 more. In 1914 we had sold about $28,000 worth, leaving us $15,000 in debt when we went into the 1915 crop. About that time the manager became sick and slid the dried-fruit department upon me.

It finally became apparent that interest and insurance would eat up the profits faster than advertising. Finally, after a good deal of argument with the board of directors and a night session, we decided to go into the advertising and put salesmen on the road and introduce loganberries in different places,

with the final result that this spring we still had a debt of $29,000, and we were going into the next season. If we could not move those berries we were doomed. Necessarily we did some tall plugging. By the first of June I had that $29,000 all back and within three months I had sold the balance of those crops and the 1916 crop, making the total sale for this year one-half million pounds.

I want to commend Dr. Caldwell on his fearlessness. He has made several statements in regard to by-products that are absolutely the truth. If you will go down into Oregon into almost any town you will find the wreck of a cannery which was either promoted by some manufacturer or by some misguided person who had the interest of the community at heart but lacked the judgment necessary to put that kind of a plant through. In the dried-fruit business there are not so very many associations; there are four in Oregon. We have in Salem two fruit-juice factories, three dried-fruit packing plants, two large canneries and three vinegar plants. There is one thing that we have our evaporators for. We are troubled during the ripening period of cherries with rain, which in some seasons causes 40 to 50 per cent of the cherries to crack on the trees. We dry those cherries and we have found by a great deal of pushing we can get a market for those cherries. The same is true of our other dried fruits; we have practically had to create a market. We are getting good prices this year for our prunes in spite of the war on account of the short crop in California. We are not encouraging anybody to put out loganberries now until we see how the juice takes. If it takes well there will be great possibilities and extension in the loganberry field.

J. B. Felts, Opportunity, Washington.: There are two sides to this co-operative proposition. This gentleman has the statistics down from the manager's side, but is the grower making a living—what amount does he get per acre?

Mr. Paulus: Down in Salem we make a living off our land. We figure our orchards are worth from $200 to $350 an acre. If you keep the price of the land down you can make a living. We have had a couple of failures in the prune business. Up to three years ago we had had only one failure, but we have had three bad years out of five.

Question: If you were in a strictly apple district what would you propose?

Mr. Paulus: I would hate to tackle any by-product, especially evaporating, on one product alone. You have got to have a variety of stuff to handle to enable you to go on the market. It might be possible to specialize on apples if you could get great enough tonnage and put up an especially fine pack.

Question: In your district you raise blackberries and other small fruits as well as loganberries?

Mr. Paulus: The canners pay so much for these fruits that we can't afford to create a market for them. If the loganberry juice pans out I think we can pay three cents a pound for the loganberries.

Relation of Height of Fruit, Etc.

Continued from page 8

specialize his spraying equipment along with the demands of his orchard. The small-capacity outfit, which did splendid work during the earlier years of orchard growth, should be replaced by a machine of high power and larger capacity in order to cope with the expansion of foliage surface which is yearly increasing and which demands just as speedy attention as did the trees when they were smaller. The machine for the older orchard should possess sufficient power to permit the operation of three leads of hose—two to be operated from the ground and the third from a tower constructed on the outfit. The rodman in this latter position can not only easily cover the tops of the trees but he can direct and oversee the work of the other men and inform them of parts of the trees that have been missed. Spraying from the tower insures the covering of the upper leaf surfaces, an accomplishment which is otherwise practically impossible in the case of large trees.

Pruning

Pruning should also prove of much benefit in reducing this tree-top infection. The cutting away of five or six feet, in the case of long straggling branches from which it is impossible properly to pick fruit, would not only reduce the time and cost of spraying but would also remove that part of the tree which is most easily neglected, and which, when neglected, scatters more scab spores advantageously than any other part of the tree.

Losses resulting from failure to spray the tops of trees thoroughly are not confined to apple-scab infection, but include all insect pests and plant diseases. In the case of most insects, their depredations cannot be tabulated in the same way as those for scab, owing to their movements over the tree. Reinfestation from the fruit-tree leaf roller, the woolly and green aphis, have been observed by the writer to result from a failure to hit the tops of the trees while spraying for these pests.

Suggestions on Beautifying the Farmstead

By V. V. Westgate, Assistant Professor of Floriculture and Gardening, Washington State College, Pullman, Washington

WHEN we think of a farmstead we picture in our minds, usually first of all, the farm buildings. As this picture develops, trees and shrubs should come before the mind's eye. In other words, then the appearance of a farmstead will depend very largely upon the buildings and plant materials. If such buildings are well constructed and properly located and the plantations of ornamental material are well worked out, the effect should be artistic.

The farmhouse should occupy a position in the foreground, as regards the other farm buildings, since it is not only the most important structure on the farm, but usually the most attractive as well. Other farm buildings ought

WHEN WRITING ADVERTISERS MENTION BETTER FRUIT

to be located at a reasonable distance to the rear of the house. Their exact positions with respect to one another should be such as will get maximum convenience and economy (this is a study in itself and is not included in this article). At times the lay of the land demands that the secondary farm buildings be nearer the highway than the house, but where such a condition is forced nothing by way of appearance is added.

Economy, as well as ornamentation, demand that all farm tools and machines be housed, which buildings, along with barns and other structures, should be kept in a neat appearance. Applications of paint at reasonable intervals will do more to produce this desired effect than anything else. Some prefer, when painting farm buildings, to use one color on the house and another color for the other buildings. Although this plan is not a bad one where the colors are carefully chosen, I, personally, prefer uniformity throughout. Light colors such as gray, drab or light brown are very good.

When considering plant materials, their use as windbreaks deserves first consderation, though the importance of this varies much in different localities. In some places in the State of Washington the value of a windbreak is largely to lessen the effects of dust storms. In other sections we keep off hot or cold winds, as the case may be. Of course, it goes without saying that windbreaks should be placed on the sides of the farmstead where they will do the most good. For most parts of the state windbreaks are of value on the southwest. A double row of Red Fir, Norway Spruce or Scotch Pine set 10-12 feet apart will give excellent protection in a few years. Evergreens, as the preceding, are preferable to deciduous forms, since they maintain their leaves during the winter months.

Partial views from the house toward certain of the farm buildings may at times be rather attractive, but I am safe in saying that an absolutely unobstructed view toward the barns and feed lots is never so. A few trees and

shrubs should therefore be placed between the house and such objects. Such plant material should be placed at some little distance from the house so the lawn or yard will not be too much broken up. When shutting off poor views, always be careful that the plantations are not so far extended as to hide scenes which are attractive, for it is as important to preserve good views as to get rid of disagreeable ones.

Sufficient shade for the farmstead can be provided by using few trees, providing they are of the proper kinds and are well placed. Never attempt to hedge in a place with shade trees. Too heavy plantings cause damp, unhealthy conditions as well as preventing views to and from the place. Two or three tall broadly-spreading varieties such as the Ash and Hackberry ought to be placed on the sunny sides of the house. One or two large trees should be planted to the rear of the house as a background. In case the house faces toward the north one lot of trees will serve both purposes. A scattering of trees should be planted around the barns for shade and ornament.

When planting trees preserve good open-lawn areas. This same rule should apply with force when locating shrubbery. Most farmhouses look well with a scattering of shrubs at their base. Such material unites the house to the lawn in an artistic manner. Considerable shrubbery can be massed at the sides and to the rear of the place. Shrubs should not be scattered over the front yard, but, as mentioned before, this should be left almost entirely open.

When selecting trees and shrubs for planting, choose those adapted to your soil and climatic conditions. The average farmer cannot afford to run an experiment station for testing plants of uncertain qualities. However, this in no sense limits his selection to three or four kinds. When the farmer desires 15-20 trees it is not necessary that he pick all Box Elders, as many have done. If he is located under average soil and climatic conditions he has a large number of good forms to pick from.

Too much planting is a common fault of most farmers when beginning landscape improvements. But comparatively few trees and shrubs are needed, provided they are carefully placed. Flower beds, consisting of common annuals and perennials, should be largely avoided on farmsteads. Such plants, though giving good effects when well tended, require too much care during the farmer's busiest season, and for that reason are of little value. Where weeds are allowed to develop among the flowers in the beds, the effect is worse than if no such flowers were used at all.

Most of us appreciate the fact that ornamental plantings add to the comfort and attractiveness of the farm. However, in addition we have a direct financial gain because such types of farms give added appeal to prospective purchasers. Sometimes a few trees and shrubs carefully placed add several hundred dollars to the sale value of that particular farm.

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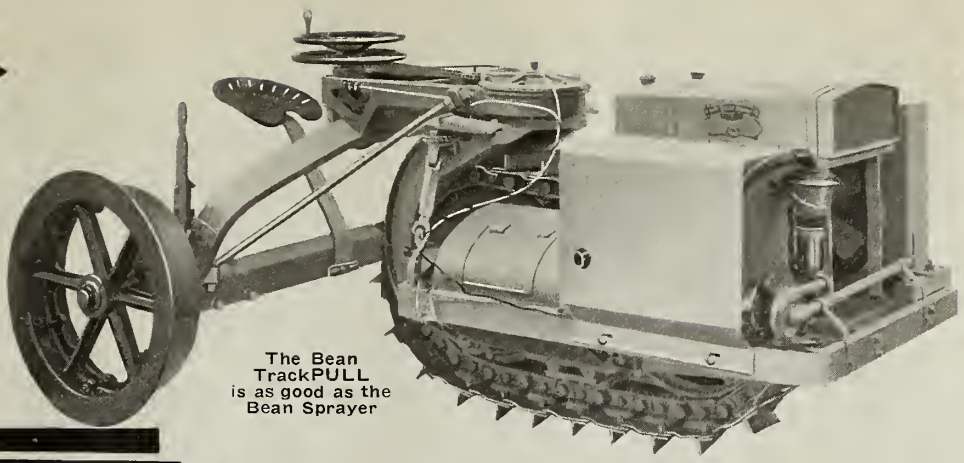

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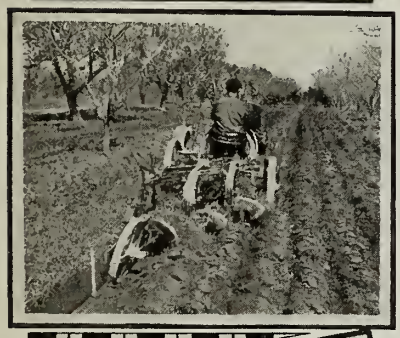

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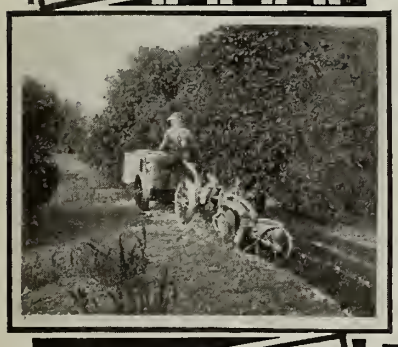

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